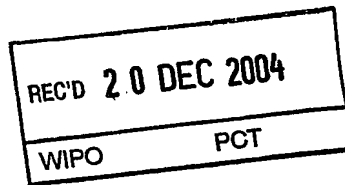




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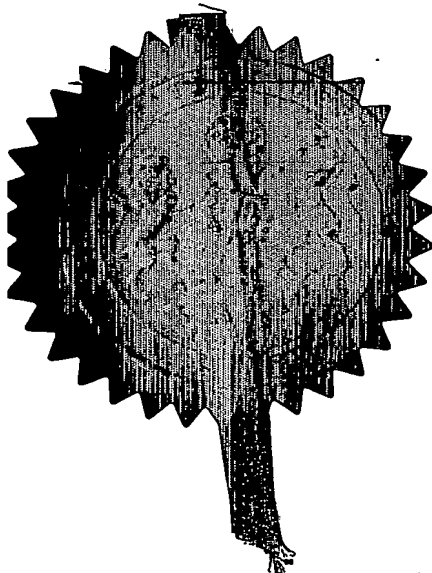
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South Wales
NP10 8QQ

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

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Dated 15 November 2004

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form.)

1. Your reference

DAL/KAN/MOU2

2. Patent application number

(The Patent Office will fill in this part)

18 NOV 2003

0326726.7

3. Full name, address and postcode of the or of each applicant (underline all surnames)

08306326001

Patents ADP number (if you know it)

Mount Packaging Systems Ltd.
 Shawcross Business Park,
 Owl Lane,
 Dewsbury,
 West Yorkshire.
 WF12 7RF

If the applicant is a corporate body, give the country/state of its incorporation

A British Company

4. Title of the invention

"Apparatus for Dispensing Measured
 Batches of Liquid"

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom
 to which all correspondence should be sent
 (including the postcode)

D.A.Lister CPA & K.A.Norcliffe CPA

D.A.Lister & Co.
 5, Greenway,
 Honley,
 Holmfirth,
 West Yorkshire.
 HD9 6NQ

Patents ADP number (if you know it)

0630543001

06065403001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor, or
 b) there is an inventor who is not named as an applicant, or
 c) any named applicant is a corporate body.
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Patents Form 1/77

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Continuation sheets of this form

Description **Four**

Claims

Abstract

Drawing(s) **One** *LM*

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of Invention and right to grant of a patent (Patents Form 7/77) **Two**

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents
(please specify)

11. For and on behalf of Mount Packaging Systems Ltd. :-

We request the grant of a patent on the basis of this application.

Signature *D.A. Lister*

Agent

Date 17.11.2003.

12. Name and daytime telephone number of person to contact in the United Kingdom

D.A. Lister
01484 663103**Warning**

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"Apparatus for Dispensing Measured Batches of Liquid"

This invention relates to apparatus for dispensing measured batches of liquid. One example of its uses is the filling of cans of paint.

5 It is known to dispense measured amounts of liquid by means of a metering pump comprising a cylinder containing a reciprocating piston and associated valves and conduits for selectively enabling a supply of liquid to communicate with one or both ends of the cylinder and for enabling measured
10 amounts of the liquid to be dispensed only from the other end of the cylinder. This arrangement performs accurately and effectively but has the disadvantages that it involves a high level of maintenance because difficult time-consuming cleaning of the rather complex pump is required,
15 and that cleaning consequently tends to allow the escape of volatile and possibly dangerous polluting substances which may be contained in the liquid.

It is also known to dispense measured amounts of liquid using an analogue meter, but this arrangement has
20 the disadvantage that it is not accurate for small quantities, say less than 10 kilogrammes, of liquid.

The object of the present invention is to avoid these disadvantages.

According to the invention, apparatus for dispensing
25 measured batches of liquid comprises means for supplying liquid under pressure to a batch dispensing valve by way of a digital mass flow meter, and computer means for

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controlling the valve in accordance with a software programme and with information received from the meter.

Preferably, the liquid supply means include a flow control valve which is disposed immediately upstream of the meter and is also controlled by the computer means.

Preferably, also, the liquid supply means include a pump with a pulsating output, and a pulsation damper disposed immediately downstream of the pump.

Alternatively, the liquid supply means include a pump with a smooth output.

Alternatively, the liquid supply means comprise a header tank.

The computer means preferably interact with other components of said apparatus by way of electro-pneumatic interface means.

The invention will now be described in greater detail, by way of example only, with reference to the accompanying drawing which is a block diagram of one practical embodiment of apparatus for dispensing measured batches of liquid.

Referring now to the drawing, this apparatus includes means for supplying liquid under pressure comprising a double-diaphragm pump 10 with a pulsating output which draws liquid such as paint from a bulk container (not shown) and delivers it by way of a pulsation damper 12 to a flow control valve 14. The liquid is then passed through a digital mass flow meter 16 which is known per se to a batch

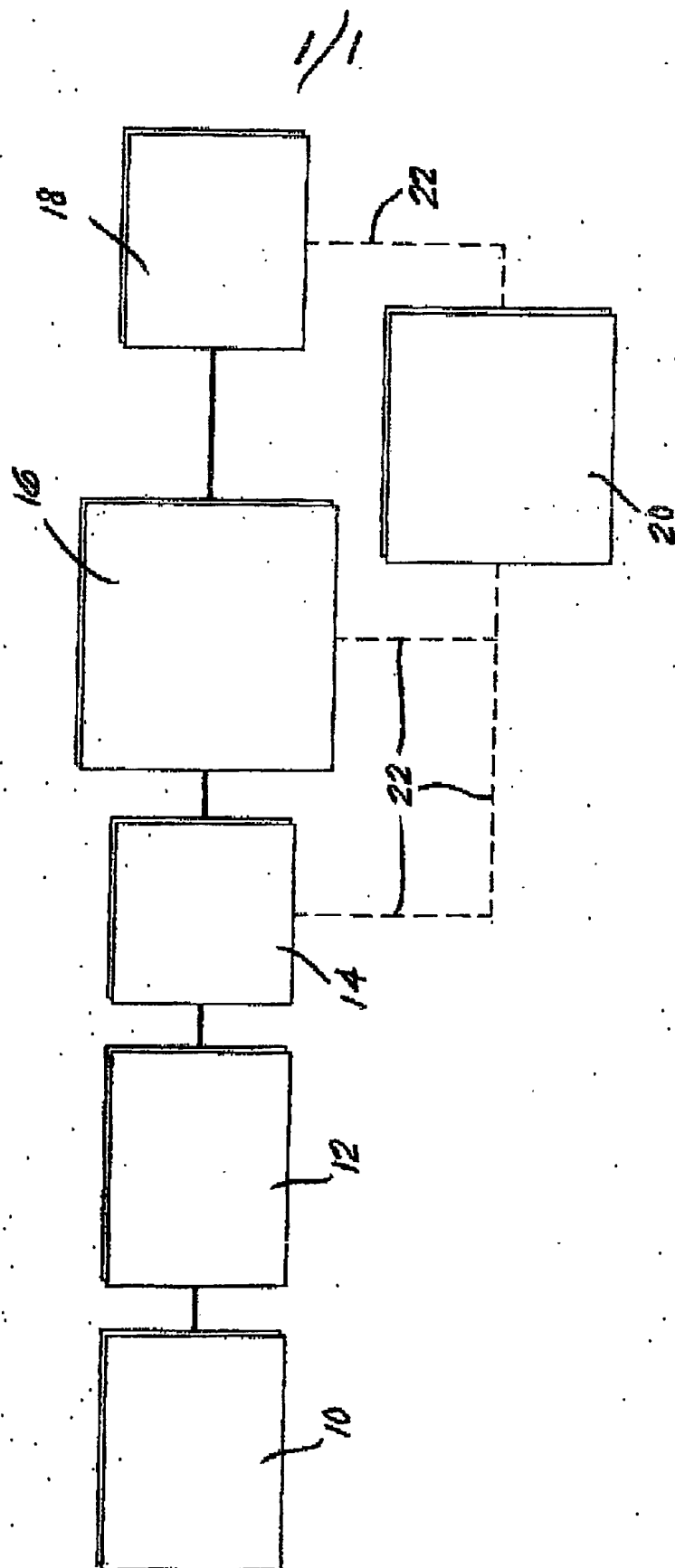
3

dispensing on/off valve 18 with an outlet (not shown). A manually operated on/off valve (not shown) can optionally be interposed between the pulsation damper 12 and the flow control valve 14. The valve 14 is adapted to be held closed to withstand pressure applied to its inlet side by the pump 10 when the apparatus is temporarily not dispensing, and to open relatively gradually at the commencement of the dispensation of each batch of liquid to moderate the initial rate of flow. The apparatus also includes computer means 20 (which expression is herein intended to include a soft-ware programmed logic controller, personal computer, or the like) for controlling the flow control valve 14 in accordance with the soft-ware programme and for controlling the batch dispensing valve 18 in accordance with said programme and with information received from the meter 16. To this end the computer means 20 interact with the valves 14 and 18 and the meter 16 by way of electro-pneumatic interface means indicated diagrammatically at 22. As there is a time-lag in the operation of the apparatus, the soft-ware programme determines the actual fill quantity as the mass measured by the meter plus a time-lag factor.

In operation, the apparatus can dispense large or small batches of liquid with great precision. Cleaning when a change of liquid is called for, by appropriate flushing, is simple and can readily be arranged to be non-

polluting as there is only a single route through the apparatus including the digital meter 16.

Various modifications are possible without departing from the scope of the invention. In one modification, any other suitable kind of pump can be employed, such as a gear-type pump with a virtually smooth (which word is herein intended to mean non-pulsating) output. In this case, the pulsation damper can be dispensed with; and furthermore, the flow control valve can be dispensed with if desired, especially where such a pump is arranged to start up with a relatively gradually increasing flow at the commencement of the dispensation of each batch of liquid. In another modification, a header tank providing a gravity feed can be employed instead of a pump, in which case the pulsation damper and the flow control valve are omitted.



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